GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

AGRICULTURAL SCIENCE SG

SECTION A

QUESTION 1A

1.1	C	1.11	A
1.2	C	1.12	C/B
1.3	A	1.13	D
1.4	C	1.14	D
1.5	A	1.15	C
1.6	A	1.16	D
1.7	C	1.17	B
1.8	B	1.18	B
1.9	B	1.19	C
1.10	B	1.20	D

20X2= **(40)**

QUESTION 1B

1.21	Soil profile
1.22	Field water capacity
1.23	Carbonic acid
1.24	Oesophaegal groove
1.25	Emulsification
1.26	Crop
1.27	Carotene
1.28	Dry material
1.29	Ovulation
1.30	L.A.N

10x2= **(20)**

QUESTION 1C

1.31	Runners
1.32	Stem tubers
1.33	Grafted rooted cuttings
1.34	Runners
1.35	Rhizomes

(5)

QUESTION 1D

1.36 Credit
1.37 Keratomalaise
1.38 Spheroid structure
1.39 R-Horizon
1.40 Clay

5x2= **(10)**

TOTAL FOR SECTION A: [75]

SECTION B

QUESTION 2

2.1 Fowl (1)

2.2
a) proventriculus = C
b) small intestine = D
c) ventriculus = G
d) crop = B
e) duodenum/liver = E (5)

2.3
A. oesophagus
B. crop
C. proventriculus
D. small intestines
E. liver
F. large intestines
G. gizzard/ventriculus
H. caeca
I. colon (9)

2.4 **Micro organisms**

-Synthesis of protein: synthesized from amino acids.
-Synthesis of vitamins: soluble vitamin B-complex and soluble vitamin K synthesized.
-Hydrolysis of protein: hydrolysed into amino acids and simpler nitrogen compounds e.g. ammonia. (6)

2.5 **Functions of Vitamin A**

- Normal vision sharpness
- Normal skeletal development
- Maintenance of epithelial tissue
- Normal reproduction (4)

2.6	2.6.1	Zinc	
	2.6.2	Iodine	
	2.6.3	Cobalt	
	2.6.4	Copper	
	2.6.5	Iron	
	2.6.6	Phosphorus	
	2.6.7	Magnesium	
	2.6.8	Vit. A	
2.7	2.7.1	**Roughage:**	Bulky feeds that contain little digestible nutrients with a high crude fibre content.
		Concentrates:	Feeds that contain more than 60% total digestible nutrients, that are less bulky with little fibre content.
		Functions concentrates:	Prevent bloating Enhance rumen development Provides bulkiness to the ration Economic Animals dependent on them
		Concentrates:	Balance roughages Fed exclusively to pigs and fowls Used for increased milk production Necessary for fattening or finishing (8) **(45)**

QUESTION 3

3.1	3.1.1	A.	uterine horn
		B.	carnucle
		C.	uterine body
		D.	fallopian tube
		E.	ovary
		F.	cervix
		G.	fornix
		H.	vagina
		I	urethral orifice
		J.	sub-urethral diverticulum
		K.	clitoris
		L.	vulva (12)
	3.1.2	a)	uterine body
		b)	fallopian tube
		c)	vagina
		d)	ovary (4)

3.2 3.2.1 **Oestrus signs**

Restlessness
Drop in milk production
Loss of appetite
Isolates herself, mounts other cows allows them to mount her
Excess mucous secretion
Vulva red and swollen, enlarged and softer
Abrasions, manure, mud observed on rear end of spine
Mucous membranes of vagina appear moist and red (8)

3.2.2 **A.I. Advantages**

- Most efficient preventative measure against diseases
- Causes decrease in occurrence of other diseases
- Rapid method of improving the quality of the herd
- Most economical method of breeding
- Variety of bulls may be used
- Increases commercial value of the herd
- Seed of an exceptional bull can be frozen and used years after its death
- Better calving percentage
- Accurate method of doing progeny testing
- Use can be made of bulls from overseas without importing them.

(Eight only) (8)

3.3 **Physiological Functional infertility**

Anoestrus (no oestrus)
Sub oestrus
Static ovaries
Persistent corpus luteum

Defective ovulation
Delayed ovulation
An ovulation
Cystic ovaries (follicular cysts) (6)

3.4 **Inbreeding disadvantages**

Lowers viability of progency
Undesirable genes are made homozygotic
Undesirable characteristics may be established in a whole herd
Decrease in genetic variation
Gives rise to defective animals
Expert knowledge required
Constitution, production and fertility of animals sometimes adversely affected (7)
[45]

QUESTION 4

4.1 4.1.1

A. stigma
B. anther
C. style
D. filament crown
E. petal crown
F. ovary
G. locule
H. ovule
I. septum
J. septal crown
K. receptacle
L. pedicel (12)

4.1.2

a) **Pedicel:** attaches the flower to the plant
b) **Receptacle:** carried the various corollas (4)

4.2 4.2.1 **Self pollination:** The transfer of ripe pollen grains from the anthers to the ripe receptive stigma of another flower of the same plant. (2)

4.2.2 **Occurs:** In plants with very small flowers
After cross pollination has failed
When the weather is unfavourable for cross pollination
In plants that are genetically homozygotic
Have uniform genetic composition. (4)

4.2.3 **Cross pollination:** It is the transfer of the ripe pollen from the anthers of a flower to the ripe receptive stigma of another flower of the same species. (2)

4.2.4 **Agents of cross pollination**

Wind: blows light dry pollen which easily floats in air
Water: ripe water plants released, float to water surface and brought into contact with each other (male and female)
Animals: brightly coloured plants attract insects that transfer pollen and flowers provide them with nectar (6)

4.3

Monocotyledonous Plants	Dicotyledonous Plants
Petals absent	Brightly coloured petals
Absence of pedicel	Pedicel connects flower to the plant
Absence of receptacle	Receptacle carries various corollas
Large anthers	Small anthers
Large feathery stigma	Small sticky stigma

(8)

4.4 4.4.1 Budding (1)

4.4.2 **Purpose:** To grow popular fruit on a hardy root stem with a well-developed root system. (2)

4.4.3
1. Eye
2. T-cut
3. root stem
4. plastic ribbon (4)

(45)

QUESTION 5

5.1 5.1.1 **Green manuring:**
The ploughing in of a green, succulent fully grown crop that is not yet ripe. (2)

5.1.2 Legumes, August (2)

5.2 **Fertilizers**

5.2.1 Potassium Sulphate
5.2.2 Dolomitic Agric Lime
5.2.3 L.A.N
5.2.4 Raw phosphate
5.2.5 Super phosphate
5.2.6 Urea
5.2.7 2:3:2 (22)
5.2.8 L.A.N/Urea (8)

5.3

	Aspect	Bare cultivation	Mulch cultivation
5.3.1	**Aeration**	Macro pores destroyed by cultivation with heavy implements, aeration is bad	Macro pores are not disturbed, very good aeration
5.3.2	**Compaction**	Increased due to use of heavy implements	Nil, soil is not disturbed
5.3.3	**Water infiltration**	Negatively affected Loose top soil layer compacted	Infiltration ability of the soil improved
5.3.4	**Nutrient status**	Nitrogen content decreased due increased microbial activity, causing a decay of reserve nitrogen	Upper soil layer protected, nutrient losses minimal
5.3.5	**Structure**	Deteriorates if soil cultivated when too wet or too dry	It improves, returns to original condition

(10)

5.4 **Drainage objectives**

Better aeration of soil
Stimulates microbe activities
Increased soil temperature
Soil easily cultivated
Increased soil infiltration rate
Harmful substances removed (6)

5.5 **Spray irrigation**

Highly permeable soil
On shallow soils with low water capacity
On soil where uniform water application is essential
When the stream of water is too weak, for floor irrigation
On land with different infiltration rates
When frost must be combated or cooling must be done
If labour is a problem
When small quantities of water per irrigation are necessary (7)

5.6 **Veld types**

Scrub: South Western Cape, winter rainfall between 300 – 750 mm per year. Little grazing value.

Forests: Temperate forest: George and Knysna.
Rainfall 800 – 2 500 mm per year
Sub-tropical forest: Port Elizabeth to Mozambique.
Rainfall 800 – 1 600 mm per year.

Savannah: Northern parts of the country. Tropical climate. Grass is the dominant plant type.
Bush savannah grass and Acacia trees dominant type.
Palatable nutritious grazing for cattle
Lowveld savannah: red grass dominant type. Valuable palatable grazing.
Bush savannah: covers biggest part of Kalahari with camel thorn and palatable red grass, bushman grass and white grass with high nutritive value. Sensitive to over grazing.

Grasslands: Gauteng, Free State, North Western Province.
Rainfall 400 – 2 000 mm per year. Palatable when young.

Semi-desert: Karoo - sparsely spread-sheep farming. Central Western Cape. Rainfall 0 – 300 mm.
West Coast - sparse palatable grass cover, nutritious, good for karakul sheep farming. (10)

[45]

QUESTION 6

6.1 **Credit**

6.1.1 **Long term** credit used to buy durable assets e.g. land, dams.
Medium term credit e.g. machinery, implements.
Short term credit e.g. seeds, fodder, fertilizer and fuel. (6)

6.1.2 **Capital problems**
Subject to high risk
Over capitalization
Under capitalization
Scarcity
High interest rates (5)

6.2 **Marketing problems**

Perishability
Standardization
Seasonal fluctuations
Production locally restricted
Middleman required
Agric products produced over a long term
Co-ordinated action of producers (Six only) (6)

6.3 **Free marketing advantages**

Payment of goods on the spot
Stimulates entrepreneur to work harder
Intermediaries limited
Quality products produced
Entrepreneurs can show initiative (5)

6.4 **Soil erosion**

Injudicious cultivation
Veld fires
Overgrazing
Marginal, erodeable soils
Rainfall is intensive, thunderstorms
Nature of surface area slope (6)

6.5 **Irrigation**

6.5.1 Drip
6.5.2 Flood
6.5.3 Spray
6.5.4 Micro/Flood
6.5.5 Flood (5)

6.6 A-pan
Tensio meter (2)

6.7 **Climate factors**

Humidity: Determines the transpiration and evaporation rate. Evaporation determines the effectiveness of rainfall.

Light: Important for photosynthesis and production of crops. Photoperiod determines the success of the production of specific plants in a particular area.

Rainfall: Its efficiency is determined by the intensity and distribution thereof as well as the time of the year at which it occurs.

Temperature: Has effect on the growth and produce of crops. Each cultivar has its own optimum temperature requirements for growth and produce.

Wind: Causes mechanical damage, increases the evaporation rate and influences photosynthesis. (10)
[45]

TOTAL FOR SECTION B: [225]

TOTAL: 300

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

LANDBOUWETENSKAP SG

AFDELING A

VRAAG 1A

1.1	C	1.11	A	
1.2	C	1.12	C/B	
1.3	A	1.13	D	
1.4	C	1.14	D	
1.5	A	1.15	C	
1.6	A	1.16	D	
1.7	C	1.17	B	
1.8	B	1.18	B	
1.9	B	1.19	C	
1.10	B	1.20	D	20X2= **(40)**

VRAAG 1B

1.21	Grondprofiel	
1.22	Veldwaterkapasiteit	
1.23	Koolsuurgas	
1.24	Slukdermgroef	
1.25	Emulsifikasie	
1.26	Oes	
1.27	Karotien	
1.28	Droë materiaal	
1.29	Ovulasie	
1.30	K.A.N	10X2= **(20)**

VRAAG 1C

1.31	Uitlopers	
1.32	Knolle	
1.33	Geënte steggies met wortels	
1.34	Uitloper	
1.35	Risoom Wortelstok	**(5)**

VRAAG 1D

1.36 Krediet
1.37 Keratomalasie
1.38 Steriodale struktuur
1.39 R-Horison
1.40 Klei

5x2= (10)

TOTAAL VIR AFDELING A: [75]

AFDELING B

VRAAG 2

2.1 Hoender (1)

2.2

a)	proventrikulus	= C
b)	dunderm	= D
c)	ventrikulus	= G
d)	krop	= B
e)	duodenum	= E

(5)

2.3

A.	slukderm (esofagus)
B.	krop
C.	proventrikulus
D.	dunderm
E.	lewer
F.	dikderm
G.	spiermaag/ventrikulus
H.	sakderm
I.	kolon

(9)

2.4 **Micro-organismis**

- **Sintese van proteïen:** gesintetiseer uit aminosure.
- **Sintese van vitamiene:** oplosbare vitamien B-kompleks.
  oplosbare vitamien K gesintetiseer.
- **Hidrolise van proteïen:** gehidroliseer na aminosure en eenvoudiger stikstofsamestellings, bv. ammoniak. (6)

2.5 **Funksies van Vitamien A**

- Normale gesigskerpte
- Normale beenontwikkeling
- Instandhouding van epiteelweefsel
- Normale reproduksie (4)

2.6	2.6.1	Sink	
	2.6.2	Jodium	
	2.6.3	Kobalt	
	2.6.4	Koper	
	2.6.5	Yster	
	2.6.6	Fosfor	
	2.6.7	Magnesium	
	2.6.8	Vit. A	
2.7	2.7.1	**Ruvoer:**	Ruvoer wat min verteerbare voedingstowwe bevat, het 'n hoë ruveselinhoud.
	2.7.2	**Konsentrate:**	Voere wat meer as 60% totale verteerbare voedingstowwe bevat, wat minder massa bevat met 'n lae veselinhoud.
		Funksionele Konsentrate:	Voorkom opblaas Bevorder rumenontwikkeling Verskaf volume aan die rantsoen Ekonomies Diere afhanklik daarvan
		Konsentrate:	Balanseer ruvoere Word uitsluitlik aan varke en hoenders gevoer Gebruik vir verhoogde melkproduksie Nodig vir vetmesting en afronding (8)

(45)

VRAAG 3

3.1	3.1.1	A.	baarmoederhoring
		B.	Karunkel
		C.	baarmoederliggaam
		D.	fallopiese buis
		E.	eierstok
		F.	baarmoedernek ringvormig
		G.	Fornix (Blindesak)
		H.	vagina
		I	uretra opening
		J.	Blindesak
		K.	klitoris
		L.	vulva (12)
	3.1.2	a)	baarmoederliggaam
		b)	fallopiese buis
		c)	vagina
		d)	eierstok (4)

3.2 3.2.1 **Estrus tekens**

Rusteloosheid
Afname in melkproduksie
Verlies aan eetlus
Sonder haarself af, bespring ander koeie en laat hulle toe om haar te bespring
Oormatige slymerige afskeiding
Vulva rooi en opgeswel, vergroot en sagter
Krapmerke, mis, modder opgemerk agter op die rug
Slymmembrane van die vagina lyk klam en rooi (8)

3.2.2 **Kunsmatige inseminasie**

- Mees effektiewe voorkomende maatreël teen siektes
- Veroorsaak 'n verminderde voorkoms in ander siektes
- Vinnige metode om die gehalte van die kudde te verbeter
- Mees ekonomiese metode van teling
- Verskeie bulle kan gebruik word
- Saad (semen) van 'n uitsonderlike bul kan bevries en jare na sy dood gebruik word
- Verhoogde kommersiële waarde van kudde
- Beter kalfpersentasie
- Kan oorsese bulle gebruik sonder om hulle in te voer

(Slegs agt) (8)

3.3 **Fisiologiese funksionele onvrugbaarheid**

Anestrus (geen estrus)
Sub-estrus
Statiese eierstokke
Vassit van corpus luteum

Defektiewe ovulasie
Vertraagde ovulasie
Geen ovulasie
Sistiese eiersakke (follikulere sists) (6)

3.4 **Nadele van inteling**

Verlaag lewensvatbaarheid van bloedlyn
Ongewenste gene word homosigoties
Ongewenste kenmerke kan in 'n hele kudde voorkom
Afname in genetiese variasie
Gebreklikhede kan voorkom
Benodig gespesialiseerde kennis
Bouvorm, produksie en vrugbaarheid van diere word soms nadelig beïnvloed (7)
[45]

VRAAG 4

4.1 4.1.1

A. stempel
B. helmknop (anther)
C. styl
D. helmdraad
E. kelkblaarkrans
F. vrugbeginsel
G. vrughok
H. ovum
I. septum
J. tussen skag
K. blombodem
L. blomsteel (12)

4.1.2

a) **Blomsteel:** verbind blom aan plant
b) **Blombodem:** dra verskeie blomkrone (4)

4.2 4.2.1 **Selfbestuiwing:** Die oordra van ryp stuifmeelkorrels vanaf die helmknoppe na die ryp, ontvanklike stempel van dieselfde blom. (2)

4.2.2 **Kom voor:** In plante met baie klein blomme
Nadat kruisbestuiwing misluk het
Wanneer die weer ongunstig is vir kruisbestuiwing
In plante wat geneties homosigoties is
Het dieselfde genetiese samestelling (4)

4.2.3 **Kruisbestuiwing:** Dit is die oordra van ryp stuifmeel vanaf die helmknoppe na die ryp, ontvanklike stempel van 'n ander blom van dieselfde plant. (2)

4.2.4 **Agente van kruisbestuiwing**

Wind: waai ligte, droë stuifmeel wat maklik sweef in die lug
Water: ryp waterplante word vrygestel en dryf na die oppervlakte van die water en word in aanraking met mekaar gebring (manlik en vroulik)
Diere: helderkleurige plante lok insekte wat stuifmeel versprei en voorsien hulle van nektar (6)

4.3

Eensaadlobbige plante	Tweesaadlobbige plante
Blomblare afwesig	Helderkleurige blomblare
Afwesigheid van blomsteel	Blomsteel verbind blom met plant
Afwesigheid van blombodem	Blombodem dra verskeie blomkrone
Groot helmknoppe	Klein helmknoppe
Groot, veeragtige stempel	Klein, taaierige stempel

(8)

4.4 4.4.1 Okulering (1)

4.4.2 **Doel:** om gewilde vrugte op 'n stewige onderstam met 'n goed ontwikkelde wortelstelsel te kweek. (2)

4.4.3
1. Ogie
2. T-snit
3. onderstam
4. plastieklint (4)

(45)

VRAAG 5

5.1 5.1.1 **Groenbemesting:**
Die inploeg van 'n groen, vlesige volwasse oes wat nog nie ryp is nie. (2)

5.1.2 Peule, Augustus (2)

5.2 **Kunsmis**

5.2.1 Kalsiumsulfaat
5.2.2 Dolomitiese landboukalk
5.2.3 K.A.N
5.2.4 Rou fosfaat
5.2.5 Superfosfaat
5.2.6 Ureum
5.2.7 2:3:2 (22)
5.2.8 K.A.N/Ureum (8)

5.3

	Aspek	Skoonbewerking	Stoppelbewerking
5.3.1	**Deurligting**	Makro-porieë word vernietig deur bewerking met swaar implemente, deurlugting swak	Makro-porieë word nie versteur nie, baie goeie deurlugting
5.3.2	**Kompaksie**	Verhoog deur die gebruik van swaar implemente	Geen, grond word nie versteur nie
5.3.3	**Waterinfiltrasie**	Negatief beïnvloed Los laag bogrond word saam gepers	Infiltrasievermoë van grond verbeter
5.3.4	**Voederopstelstatus**	Stikstofinhoud het afgeneem vanweë 'n verhoogde mikrobe-aktiwiteit, wat die oorblywende stikstof vernietig het.	Boonste grondlaag het dit beskerm en die voedingstofverliese was minimaal
5.3.5	**Struktuur**	Gaan agteruit as grond wat te klam of te droog is, bewerk word	Dit verbeter – keer terug na oorspronklike toestand

(10)

5.4 **Doelwit van dreinering**

Beter deurlugting van grond
Stimuleer mikrobe-aktiwiteit
Verhoog grondtemperatuur
Grond maklik bewerkbaar
Verhoogde grondinfiltrasiekoers
Skadelike stowwe word verwyder (6)

5.5 **Sprinkelbesproeiing**

Hoogs deurdringbare grond
Op vlak grond met 'n lae waterkapasiteit
Op grond waar eenvormige watertoediening noodsaaklik is
Waar die stroom water te swak vir vloerbesproeiing is
Op land met verskillende infiltrasievlakke
Waar ryp beveg moet word of waar afkoeling gedoen moet word
Indien arbeid 'n probleem is
Waar klein hoeveelhede water per besproeiing nodig is (7)

5.6 **Veldtipes**

Struike: Suidwestelike Kaap
Winterreënval tussen 300 – 750 mm per jaar
Min weidingswaarde

Woude: Matige woude: George en Knysna.
Reënval 800 – 2 500 mm per jaar.
Subtropiese woude: Port Elizabeth na Mosambiek
Reënval 800 – 1 600 mm per jaar.

Savannah: Noordelike dele van die land. Tropiese klimaat.
Gras is die dominante plant tipe.
Bossavanna: Gras en akasiabome is die dominante tipe.
Smaaklike voedsame weiding vir vee
Laeveldsavanna: rooigras dominante tipe
Waardevolle eetbare weiding
Bossavanna: Beslaan die grootste deel van die Kalahari met kameeldoring en smaaklike rooigras, boesmangras en witgras met 'n hoë voedingswaarde.
Sensitief vir oorbeweiding

Graslande: Gauteng, Vrystaat, Noordwes Provinsie
Reënval 400 – 2 000 mm per jaar. Eetbaar as jonk.

Halfwoestyn: Karoo – yl verspreide skaapboerdery. Sentraalweskaap.
Reënval 0 – 300 mm per jaar.
Weskus - skaars smaaklike grasbedekking, voedsaam, goed vir karakoelboerdery. (10)
[45]

VRAAG 6

6.1 **Krediet**

6.1.1 **Langtermynkrediet** word gebruik om duursame bates soos grond en damme aan te skaf.
Mediumtermynkrediet bv. masjiene en toerusting.
Korttermynkrediet bv. saad, voer kompos en brandstof. (6)

6.1.2 **Kapitaalprobleme**
Onderworpe aan hoë risiko
Oorkapitalisering
Onderkapitalisering
Skaarste
Hoë rentekoerse (5)

6.2 **Bemarkingsprobleme**

Bederfbaarheid
Standaardisering
Seisoenale fluktuasies
Produksie plaaslik beperk
Middelman benodig
Landboukundige produkte oor lang termyn vervaardig
Gekoördineerde aksie van vervaardigers. (Slegs ses) (6)

6.3 **Voordele van vrye bemarking**

Onmiddellike betaling vir goedere
Spoor entrepreneur aan om harder te werk
Beperk tussengangers
Gehalte produkte vervaardig
Entrepreneurs kan inisiatief toon (5)

6.4 **Gronderosie**

Onoordeelkundige bewerking
Veldbrande
Oorbeweiding
Marginale erodeerbare grond
Intensiewe reën, donderstorms
Aard van oppervlakgebiedhelling (6)

6.5 **Besproeiing**

6.5.1 Drup
6.5.2 Vloed
6.5.3 Sprinkel
6.5.4 Mikro/Vloed
6.5.5 Vloed (5)

6.6 A-pan
Tensiometer (2)

6.7 **Klimaatfaktore**

Humiditeit: Bepaal die transpirasie- en verdampingstempo. Verdamping bepaal die effektiwiteit van reën.

Lig: Belangrik vir fotosintese en oesverbouing. Fotoperiode bepaal die sukses van die verbouing van spesifieke plante in 'n bepaalde area.

Reënval: Die doeltreffendheid word deur die intensiteit en verspreiding daarvan bepaal, asook die tyd van die jaar waarin dit voorkom.

Temperatuur: Het 'n invloed op die groei en lewering van oeste. Elke kultivar het sy eie optimum temperatuurbehoeftes vir groei en lewering.

Wind: Veroorsaak meganiese skade, verhoog die verdampingstempo en beïnvloed fotosintese. (10)
[45]

TOTAAL VIR AFDELING B: [225]

TOTAAL: 300